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ENTOMOLOGICAL NEWS

DECEMBER 1952

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ENTOMOLOGICAL NEWS

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New Taxonomic Entities in Neotropical Aeshnas (Odonata: Aeshnidae).

By PHILIP P. CALVERT, University of Pennsylvania and Academy of Natural Sciences of Philadelphia

Work on the neotropical species of the genera *Aeshna* and *Coryphaeschna,* announced in the NEWS for October, 1936 (Vol. xlvii–8–: 213–214), has progressed so far that blocks for 45 half-tone plates have been made and the explanation thereof has been typed. The mechanical work of preparing the remainder of the text for the printer is sufficiently extensive as to make it desirable to give nomenclatural status to the names of new species, subgenera and genera adopted by publishing them at this time.

Cockerell established the subgenus Hesperaeschna (Proc. U. S. N. M. 45–2000–: 581, 1913) for *Aeschna californica* Calv., giving as its characters (1)* "M3 and M4 separated by one cell only at margin of wing, but a short distance before by two rows of cells, owing to the deflection of M4 from the straight course; (2) cell formula of triangles 2,1,1; (3) upper branch of radial sector in a line with the stem; (4) Rs separated from supplementary vein below it by only three rows of cells; (5) fork of Rs a short distance before the beginning of stigma."

The venation of *Aeshna californica* is figured by Needham, Proc. U.S.N.M. 26 (1331), pl. 40, fig. 1, 1903.

The characters given for *Hesperaeschna* by Cockerell will, in many cases, serve to differentiate it from *Aeshna* Fabr., whose

* The numbers in parentheses () are solely to facilitate reference to the characters.

generotype was fixed by Westwood (1840) as *Ae. grandis* (Linn.). The venation of *grandis* is shown in an excellent photographic reproduction by Fröhlich (Odon. u. Orthop. Deutschlands, Fischer, Jena, taf. 3, fig. 10, 1903) and in figures by Lucas (Brit. Dragfls., pl. xviii, 1899) and Longfield (Dragfls. Brit. Isles, edit. 1, 1937, pl. 21, edit. 2, 1949, pl. 30). Cockerell's characters serve to differentiate *Hesperaeschna* from the figures of some other European Aeshnas (*juncea, caerulea, cyanea,* but *not isosceles* (*rufescens*) or *mixta*) in Lucas and Longfield and from the figure of the North American *Ae. eremita* in Walker's *Aeshna,* p. 15, 1912.

When, however, series of individuals of various species of "*Aeshna*" are examined, it will be found that most of Cockerell's characters shade from the condition given for *Hesperaeschna* into those existing in *Ae. grandis* and its nearest allies. The tables of Bartenef (Zool, Anz. 89 (1–2) : 39–44, 1930) for 12 palaearctic species of *Aeschna* are illuminating in this respect.

Other characters existing in Cockerell's generotype of *Hesperaeschna* (*californica*) are more constant; among these are (**6**) the presence of a ventral tubercle on the first abdominal segment; (**7**) supratriangular cross-veins present; (**8**) thorax dark with two lateral pale stripes; (**9**) males with superior appendages in lateral edge view not bifid nor with an anteapical ventral point, (**10**) a median dorsal carina on abdominal segment 10 and (**11**) anal triangle of hind wings 3-celled.

Of the characters 6–11, only 6 and 11 separate *Hesperaeschna* from typical *Aeshna* and from the first ten of the sixteen North American species of *Aeshna* treated by Walker (1912) ; char. 6 separates it also from *palmata, umbrosa* and *constricta* of North America; others, 7–10, in various combinations, separate *Hesperaeschna* from other groups, as indicated below.

Cockerell referred no other species than *californica* to *Hesperaeschna.* In its modified definition, as here presented, *Hesperaeschna* includes *californica, biliosa* Kennedy (in which the two lateral pale thoracic stripes are broken into spots), *confusa* Rambur, *cornigera* Brauer, *haarupi* Ris, *joannisi* Martin, *manni* Williamson, *marchali* Rambur, *peralta* Ris, *psilus* Calvert,

punctata Martin, *variegata* (Fabricius) Ris and *williamsoniana* Calvert.

Aeshna (Hesperaeschna) cornigera planaltica new subspecies

Proposed for the more southern members of *Ae. cornigera* Brauer which have the pale lateral thoracic (mes- and metepimeral) stripes constricted on the anterior margins by a deep sinus or indentation, in contrast with the more northern typical examples in which these stripes are not constricted. These differences are referred to by Calvert, Biol. Centr.-Amer. Neur. Supplement, p. 400, 1907, and by Ris, Arch. f. Naturges. 82 A (9) : 157–8, 1918, but without the application of distinctive names.

Holotype ♂ of *planaltica,* Nova Teutonia, Santa Catarina, BRAZIL, Dec. 1, 1935, by Fritz Plaumann, coll. Calvert (No. 226). *Paratypes:* Huigra, Feb. 12–13, 1911, by Samuel N. Rhoads, 1♂ 1♀, Acad. Nat. Sci. Philadelphia, Abitagua, 5.xi.39, by MacIntyre, 1♂, coll. C. H. Kennedy, and Naranjapata, by F. Campos R., No. 34, 1♂, Acad. Nat. Sci. Phila. all three ECUADOR; vicinity of Guayabamba, Dept. Amazonas, Aug. 14, 1936, 2♂, 1♀, and vicinity of Llangua River, Lallanga, Dept. Cajamarca, June 13, 1936, 1♂, both localities PERU and by Felix Woytkowski, Mus, Zool. Univ. Mich.; Rio Perené, 1♂, San Ramon, Oct., 1930, 1♀, La Merced, Chancamayo, 1♀, from Dr. P. Martin, and Oxapampa, "Staudinger vd.", 2♂, all PERU, coll. J. Cowley; Sapucay, PARAGUAY, Nov. & Dec., 1899, by W. T. Foster, 3♂, U. S. Nation. Mus.; Nova Teutonia, Brazil, as above for holotype, Nov. to March, 8♂, 1♀, coll. C. H. Kennedy, 6♂, 3♀, coll. Calvert; Buschental, Dept. San José, Nov. & Dec., 1934, 2♂, and Aigua, 1♂, by H. Schneider, both URUGUAY, coll. J. Cowley.

The proposed name *planaltica* refers to the area Plano Alto, as shown on maps, pls. xi and xii, of Haseman's "Some Factors of Geographical Distribution in South America" (Annals New York Acad. Sci. xxii, 1912).

Cornigera planaltica and *c. cornigera* meet at Abitagua, Ecuador. As indicated in the list of types above, *planaltica* extends

from Ecuador to Uruguay, and is the only form of *cornigera* known to me to occur south of 15 degrees South Latitude. *C. cornigera* reaches from Mexico to Bolivia.

For the three neotropical species, *brevifrons* Hagen, *intricata* Martin and *vigintipunctata* Ris, the new subgenus *Marmaraeschna* is proposed, with *intricata* as generotype. Its characters are (12) abdominal segment 1 with a ventral tubercle; (13) supratriangular cross veins present; (14) thorax pale with scattered black marks; (15) vein M1a beginning proximal to the level of the stigma or under the proximal end or proximal half of the stigma; males with (16) a mid-dorsal longitudinal carina on abdominal segment 10, (17) superior appendages, in lateral edge view, with the apex not bifid nor with an anteapical ventral point, (18) anal triangle 3-celled.

The name *Marmaraeschna,* from the Greek μάρμαρος, marble, and *Aeschna,* has been suggested by the use of the word "marbré" by Martin in his description of the thorax of *intricata* (1908, p. 59) and of "marmoriert" applied by Ris (1918, p. 164) to the thorax of *vigintipunctata.*

Character 14 separates *Marmaraeschna* from all its allied subgenera and genera, also 12 from typical subgenus *Aeshna* and from *Coryphaeschna,* 13 and 15 from the subgenus *Neureclipa* (see below), 16 from *Coryphaeschna* and 17 from *Schizuraeschna* (also below).

For the nearctic-neotropical group, *multicolor* Hagen, *mutata* Hagen, *jalapensis* Williamson and *dugesi* Calvert, the new subgenus *Schizuraeschna* is proposed, with *multicolor* as the generotype; the name is from the Greek σχιζω, to split, ουρα, tail, and *Aeschna,* in allusion to the bifid apex of each male superior appendage. The characters are (19) abdominal segment 1 with a ventral tubercle; (20) supratriangular cross-veins present; (21) thorax dark with two pale oblique lateral stripes; (22) veil M1a beginning distal to the level of the stigma, or under the distal end thereof; (23) cell formula of discoidal triangles 2,1,1(,1); (24) internal triangles 2-celled; males with (25) a mid-dorsal longitudinal carina on abdominal segment

10, (**26**) superior appendages, in lateral edge view, bifid in the apical fourth or less, the lower division much shorter than the upper and in one species (*dugesi*) reduced to an inferior anteapical point, (**27**) anal triangle of the hind wings 3-celled. Character 26 distinguishes *Schizuraeschna* from all its allied genera and subgenera, and in addition 19 separates it from the typical subgenus *Aeshna,* 20, 23 and 24 from the subgenus *Neureclipa* (see below), 21 and 22 from the subgenus *Marmaraeschna,* 19, 25 and 27 from *Coryphaeschna,* 24, 27 and the absence in the male of the posterior ventral teeth of abdominal segment 1, described below under *Castoraeschna,* from that genus.

The genus *Neureclipa,* here relegated to subgeneric rank, was proposed by Navás (Revista Museu Paulista 8: 478, 1911) for *bonariensis* Rambur and *litigatrix* Navás, with the following characters; (**28**) hypertrigonal (supratriangular) space in each wing with no cross-veins, male (**29**) having the 10th (abdominal) segment with a dorsal tooth and (**30**) the superior cerci with an inferior tooth, "otherwise as in *Aeschna.*" As Navás did not specify a generotype, as he mentions *bonariensis* first and as *litigatrix* may not be specifically different, *bonariensis* is here fixed as the generotype.

The following are here added as subgeneric characters of *Neureclipa:* (**31**) abdominal segment 1 with a ventral tubercle; (**32**) vein M1a beginning at the level of the distal half, or distal end, of the stigma, or distal to the level of the stigma; (**33**) thorax with two oblique pale lateral stripes; (**34**) cell formula of discoidal triangles usually 1,1,1; (**35**) internal triangles usually 1-celled; males with (**36**) anal triangle of the hind wings 3-celled, (**37**) superior appendages, in lateral edge view, not bifid at the apex nor with an inferior anteapical point.

Neureclipa is differentiated from typical *Aeshna* by characters 28, 31, 34, 35 and 36, from *Hesperaeschna* by 28 (and from some of its species by 34 and 35), from *Marmaraeschna* by 28, 32 and 33, from *Schizuraeschna* by 28, 34, 35 and 37, from *Coryphaeschna* and *Castoraeschna* (see below) by Rs forking proximal to the level of the stigma, with three rows of cells be-

tween the fork at the level of the distal end thereof, and by the proximal side of the discoidal triangle of the hind wings half, or more than half, as long as the hind side, and, in addition, from *Coryphaeschna* by characters 28, 29, 31 and 36. Characters of *Neureclipa* separating it from *Castoraeschna* are the absence of the two ventral posterior teeth of abdominal segment 1 of the male and 28 and 36.

In addition to *bonariensis* (including *litigatrix?*), *Neureclipa* embraces *diffinis* Rambur, *galapagoensis* Currie and two forms here presented as undescribed: *N. diffinis absoluta* and *N. elsia*. The pale mesepimeral stripe seems to be the chief differential for the species of *Neureclipa*. It appears to be absent in all studied material of *galapagoensis;* it reaches upward to the upper margins of the mesepimeron and metepisternum in *bonariensis, elsia,* and *diffinis absoluta,* but only part way (¾ or less) to those upper margins in *diffinis diffinis*.

Aeshna (Neureclipa) diffinis absoluta new subspecies

♂. Frons above and face pale cadmium yellow (Smith's Glossary), labium pale clay yellow, stem of black T-spot of frons narrowing forward from base (.9–1.23 mm.) to .33–.57 mm. at almost its junction with the top of the T, bordered on each side by a parallel pale yellow stripe not as wide as the black stem, this in turn followed laterad by an isolated subquadrangular purple brown spot reaching laterad to beyond the level of the end of the top of the T. A pale brown, occasionally black, line on the fronto-nasal suture. Most of the vertex and of the occiput pale yellowish.

Pterothorax a rather pale greenish brown; pale bluish antehumeral stripe occupying a little less than the lower half of the mesepisternum, .74–1.23 mm. long, .25–.33 mm. wide, diverging downward (forward) from its fellow of the opposite side; pale yellow mesepimeral stripe as stated above under the genus, .41–.82 mm. wide at mid-height, nearly straight; a pale yellow metepimeral stripe likewise reaching to the upper margin of its sclerite, .50–.65 mm. wide at mid-height, almost straight, continued on to the sides of abdominal segments 1 and 2.

Pale brown markings on dorsum of abdominal segments 3–10 consist of anterior dorsal, mid-dorsal and posterior dorsal spots (AD, MD and PD of Walker, 1912); taken collectively they exceed in area the black which bounds them on 3–7, but AD rapidly decreases on 7 and 8 to zero on 9 and 10.

Wings with 12–14 antenodals on front pair, 8–10 on hind, 6–9 postnodals on front, 8–11 on hind; hind wings with 2 vertical rows of cells in the anal loop (3 rows in one wing out of 14). Pterostigma pale brown ochre to pale Van Dyke brown above, in some paler at distal end, below gamboge; membranule brown, basal 4th to 5th white.

♀. Differs from the male as follows: Face a little darker; lateral genital plates one-half as long as ovipositor.

Dimensions: Abdomen (excluding appendages) ♂ 34–35, ♀ 32.5–36; hind wing ♂ 34–35, ♀ 35.5–37; superior appendages ♂ 4.34–4.75, ♀ 3.8–4.5; pterostigma ♂ 2.45–3.45, ♀ 2.9–3.27 mm.

Holotype ♂ vicinity of Concepcion, PERU, April 7–8, 1935, by Felix Woytkowski, Mus. Zool. Univ. Mich. *Allotype* ♀ and paratypes 3 ♂, 3 ♀, same data as for holotype; also *paratypes* 7 ♂, 1 ♀, same locality, collector and museum, but dated April 26–27, 1935, and 1 ♀ Cotahuasi, Peru, 9000 feet, October, 1911, Yale Peruv. Exp. in U. S. National Museum.

Distribution: Concepcion and Cotahuasi, PERU.

The proposed subspecific name, *absoluta*, refers to the completeness of the pale epimeral stripes in that they reach upward to the upper margin of their respective sclerites.

In *diffinis diffinis* Rambur the epimeral stripes reach upward only to three-fourths or less of the height of the sclerites and the geographical distribution is from Valparaiso to Filuca, Chile, on the Pacific slope, and Montevideo and Buenos Aires on the Atlantic slope, of the material which I have examined. Navás (1933, Revista Acad. Cien, Madrid 29: 54) has cited *diffinis* from Arequipa, Peru, and Porter (1897, Revista Chil. Hist. Nat. 1: 13, 1899, 3: 181) from Copiapo and the province of Atacama, Chile; whether these more northern examples of *diffinis* are *d. diffinis* or *d. absoluta* is still to be determined.

Bonariensis is like *diffinis absoluta* in having the long pale epimeral stripes and a pale antehumeral stripe on the lower half of the mesepisternum. The geographical distribution of *bonariensis* is very different, ranging from the States of Minas Geraes and Paraná in Brazil and San Juan Province in Argentina to Montevideo and Buenos Aires; there is also a single Chilean record, viz. Las Mercedes by Gonzulla & Ruiz (1928). I have designated *absoluta* as a subspecies of *diffinis* rather than of *bonariensis* because of the predominantly Pacific distribution of the first two.

Aeshna (Neureclipa) elsia new species

♂. Frons pale clay yellow (Smith's Glossary, pl. iv, 22), superiorly with a black T-spot whose stem narrows from base (.65–1.23 mm. wide) anteriorly to .41–.65 mm. almost at its junction with the top of the T; stem bordered each side with yellow which is not as wide as the base of the stem but is wider than the stem where the latter joins the top of the T.* This bordering yellow followed laterad by greenish blue which extends laterad on to the side of the frons beyond the level of the acute end of the top of the T. Anterior surface of frons pale brownish in its upper half, very pale bluish in its lower half. Fronto-nasal suture with a brown line.* Clypeus (nasus + rhinarium) very pale bluish. Labrum near gamboge or pale bluish. Labium pale bluish to pale clay yellow. Most of the vertex and of the occiput pale clay yellow or bluish.

Pterothorax pale greenish brown, no pale antehumeral stripe. Mesepimeral stripe often faded in dried specimens, bluish white, reaching upward to the upper margins of mesepimeron and metepisternum, .9–1.6 mm. wide at mid-height, ending below in a crescentic yellow spot, convexity ventrad; this yellow spot is often all that is visible of the mesepimeral stripe in many specimens. Metepimeral stripe bluish white, reaching to the

* The male from Patagonia, No. 134, has the T-spot and the blue spot following the bordering yellow as described above for *diffinis absoluta* and has a well-marked black line on the fronto-nasal suture.

upper margin of its sclerite, 1.2–1.6 mm. wide at mid-height, lower end narrowing to .5 mm., yellowish.

Abdominal segment 1 largely brown ochre on the sides, dorsally, as well as the anterior dorsal half of 2, Van Dyke brown. Most of the posterior half of 2 and the mid-dorsal (MD of Walker, 1912), posterior dorsal (PD), antero-lateral (AL), mid-lateral (ML) and posterior lateral (PL) spots on 3–8 and much of the posterior half of 9 and 10 bright blue. Remainder of the abdominal tergites black, or on 3–5 dark brown. Mr. Woytkowski, the collector, noted on the envelope of the Chosica male: "has fine very vivid blue marks, which have become dull after drying."

Wings with 11–14 antenodals on front pair, 8–9 on hind; 7–9 postnodals on front, 7–10 on hind; hind wings with 2 vertical rows of cells in the anal loop, occasionally (7 wings out of 26) 3 cells at the lower end. Pterostigma near Van Dyke brown above, paler at the extreme ends, pale brown to pale clay yellow below. Membranule brown, whitish at extreme base.

♀ differs from the male: (In the two females from Miñi-Miñi the anterior surface of the frons and clypeus lavender, labium pale rosaceous.) Fronto-nasal suture with a very pale brown line. Blue of the abdomen replaced by lilaceous or a paler blue, the black replaced by dark brown (Roman sepia or Cologne earth of Smith), which is less extensive than the black of the male. Pterostigma pale brown ochre (or burnt siena, Azapa) above, pale brown pink (Smith) or pale clay yellow below; basal sixth to third of membranule whitish. Lateral genital plates one half as long as the ovipositor.

Dimensions: Abdomen (excluding appendages) ♂ 37–40, ♀ 35–39; hind wing ♂ 35–40, ♀ 36.5–40; superior appendages ♂ 4.42–4.82, ♀ 3.93–4.25; pterostigma, costal edge, front wing, ♂ 2.6–3.35, ♀ 2.95–3.52 mm.

Holotype male and *allotype* female vicinity of Pacasmayo, Peru, May 20, 1936, a mating pair taken over a pond between sand dunes, Felix Woytkowski collector, No. 2222, Mus. Zool. Univ. Mich. *Paratypes:* same locality, date and collector 1 ♂ (P.P.C. no. xix); vicinity of Villa, 120 m. a(bove) s(ea)

lev(el), Dept. Lima, Peru, Mar. 15, 1936, same collector, 6 ♂ 1 ♀; Repartición, 140 m. a. s. level, Dept. Lima, Peru, 1 ♂ Feb. 28, 1 ♂ Feb. 29, 1936, same collector; vicinity of Chosica, 990 m. a. s. level, Dept. Lima, Peru, Mar. 1, 1936, 1 ♂, same collector, Mus. Zool. Univ. Mich. Miñi-Miñi, 18.ii.48, 2 ♀ and Azapa, 1.iii.48, 1 ♀, CHILE, Cornell Univ. Coroicó, Chile, May, Steind[achner?], 1 ♂, 1 ♀, Mus. Comp. Zool. Patagonia 1 ♂, Amer. Mus. Nat. Hist. (P.P.C. no. 134).

Named for Elsie Lincoln Rosner who made the great majority of the drawings referred to in the opening paragraph of this paper and helped in tabulating characters.

As stated above under the subgenus *Neureclipa, N. elsia* differs from *N. diffinis diffinis* and agrees with *N. d. absoluta* and *bonariensis* in having the pale epimeral stripes reaching upward to the upper margins of their respective sclerites. It differs from *bonariensis* in geographical distribution which has been given above under *d. absoluta.* The distribution areas of *elsia* and of *d. absoluta,* both in Peru, are not as widely separated and additional material may show that they overlap. *Elsia* has the epimeral stripes bluish white, terminating inferiorily in a yellow spot, and wider at mid-height (.9–1.6 mm.) while in *bonariensis* and in *d. absoluta* they are yellow throughout and narrower (.41–.74 mm.) at mid-height. When, as so often happens, the epimeral stripes are faded in specimens of *elsia,* very close examination of them under a lens is necessary for identification.

Coryphaeschna secreta new species

♂. Frons superiorly and face, including lips, pale brown ochre (Smith's Glossary, pl. iv, 36), no T-spot on dorsum of frons, vertex pale Van Dyke brown.

Pterothorax darker Van Dyke brown; antehumeral, mes- and metepimeral stripes green, all narrower than the intervening brown, the green antehumeral narrowing inferiorly.

Abdomen a pale reddish brown (faded?), paired pale green anterior dorsal, median dorsal and posterior dorsal spots on segments 4–6, posterior dorsal also on 7(?) and 8; 10 with a low continuous mid-dorsal carina.

Superior appendages in bad condition, the left 5.15 mm. long, the right broken off at .29 length, the left with a piece .57 mm. long broken out of the lateral margin just beyond half length; left appendage with lateral margin slightly sinuate in the middle third of its length, inner (mesal) margin narrowed to .2 of appendage length, thence gradually widening to mid-length, thence narrowing to .83 length, whence the appendage is of nearly uniform width to the rounded apex; distal half of inner margin with hairs longer than appendage width; a distinct, inferior, subbasal tooth at .14 of appendage length. Inferior appendage broken off (at somewhat more than half length?).

Wings: area between Cu1 and Cu2 on hind pair with one row of cells throughout; this character variable in *C. luteipennis* Burm.

Dimensions: Abdomen (excluding appendages) 51, hind wing 47, sup. apps. 5.15, pterostigma, costal edge, front wing, 3.93 mm.

♀ unknown.

Holotype male: S. Diego d 1 Baños, CUBA, Apr. 14 00 Palmer & Riley U. S. National Museum.

The proposed specific name refers to the long concealment of this large insect in spite of much biological exploration of Cuba.

Secreta falls under rubrics F, G of the key to the species of *Aeschna,* Biol. Centr.-Amer. Neur., p. 180, and under rubrics A, 1, 2 (in part) of the key to the species of *Coryphaeschna* by Geijskes, Ent. News liv (3): 63, March, 1943. Its nearest allies by these two keys are *luteipennis* Burm. and *ingens* Rambur. From the males of *luteipennis* and *rufipennis* Kennedy it differs in lacking a quadrangular excision on the inner margin of the superior appendages. From *ingens* male it differs in its smaller size; abdomen 51 mm. vs. 58–61 mm. (*ingens*), hind wing 47 vs. 55–59, sup, apps. 5.15 vs. 7–7.75, pter. 3.93 vs. 4.83–6. mm., and from both species by the lack of a dark T-spot on the dorsum of the frons.

Coryphaeschna viriditas new name for *C. virens* Rambur preoccupied

Aeschna virens Rambur, 1842, Hist. Nat. Ins. Névroptères, p. 193, is a homonym of *Ae. virens* Charpentier, 1840, Libel. Europ., p. 101, tab. x, xii.

CASTORAESCHNA new genus

(38) Subnodal sector (Rs) forking at the level of from one-half the last postnodal costal cell to three postnodal costal cells proximal to the stigma, or, more rarely, at the level of the proximal end of the stigma, with (39) 3 or 4, rarely 2, rows of cells between the fork at the level of the distal end of the stigma; (40) proximal side of the discoidal triangle of the hind wings always shorter than one-half the length of the hind side; (41) sternite of abdominal segment 1 with a median tubercle bearing spinules, hairs, or both; (42) internal triangles 1-celled; males with (43) ventral posterior angles of tergite of abdominal segment 1 each prolonged into an acute mesad-projecting tooth;* (44) anal triangle of the hind wings 2-celled; (45) glans penis with a thread-like dorsal cornu. Generotype: *Aeschna castor* Brauer.

The generic name proposed is a combination of the specific name of the generotype and *Aeschna.*

This genus differs from all other genera of American Aeshninae by character 43 and in addition from *Coryphaeschna* by 41, and usually from the subgenera of *Aeshna* by 40. It includes also *colorata* Martin, *coronata* Ris, *januaria* Hagen and *longfieldae* Kimmins.

The claim of this group of species to generic rank was recognized by Ris (1918, Arch. Naturges., 82 A (9) : 169) and by Geijskes (1943, Ent. News liv (3) : 61), but no one seems to have given the group a generic name.

* Figures of these teeth in two species of *Castoraeschna* are given by Kimmins, 1929, Ann. & Mag. Nat. Hist. (10) iii: 490, figs. 1A and B.

The Status of Some Australian Amblyopone Species (Hym.: Formicidae)

By W. L. Brown, Jr., Museum of Comparative Zoology, Harvard University

A recent tour of Australia and a visit to the British Museum (Natural History) permit me to correct the synonymy of some of the smaller, yellowish species of *Amblyopone* Erichson with longitudinally striate heads, related to *A. ferruginea* Fred. Smith.

Amblyopone ferruginea Fred. Smith

A. ferruginea Fred. Smith, 1858, Cat. Hym. Brit. Mus. 6: 110, worker, *nec A. ferruginea* Wheeler, 1927, Proc. Amer. Acad. Arts Sci. 62: 20–22, fig. 5, worker.
A. ferruginea Clark (*in litt.*) in Wheeler, 1927, *op. cit.*, p. 22, Victorian records.
A. mandibularis Clark, 1928, Jour. R. Soc. W. Aust. 14: 33–34, Pl. 1, figs. 12–15, worker. New Synonymy

The worker of this species has the inner mandibular borders crowded with small, mostly subequal teeth, usually double-ranked in unworn specimens; no very large tooth in an isolated position basad of the midlength. So far as I am aware, the distribution as known is confined to Melbourne and suburbs plus the adjacent lower basin of the Yarra River and the stretch of country immediately south of the Dandenong Ranges and west to Port Phillip Bay. Melbourne is the type locality given by Smith.

Workers from the type nest of Clark's *A. mandibularis*, from Belgrave, Victoria, kindly given me by the original collector, Mr. F. E. Wilson, have been compared by me with the *A. ferruginea* holotype and prove to be the same species.

I have seen *A. ferruginea* from additional Victorian localities as follows: Ferntree Gully (F. P. Spry). Greensborough (J. McAreavey). Burnley; East Burwood; Mooroolbark; Lower Ferntree Gully; Warrandyte; Research; Eltham (W. L. Brown). This ant is strongly hypogaeic, and therefore,

while common in its range, it is not very commonly seen except after the winter and spring rains, when the workers come up beneath logs and stones or are washed out onto the ground surface. I have seen numerous enfeebled and dead workers on the surface after particularly heavy rains during the winter of 1951 in the park at Burnley, where *Iridomyrmex* workers carried them off by the dozen.

The preferred habitat is in the soil of medium-rainfall sclerophyll forest such as the eucalypt-wattle bush to the east of Melbourne, or in the *Eucalyptus elaeophora-E. macrorrhyncha* association of the Eltham district. This species appears to be replaced in the wetter sclerophyll forest and fern gullies by *Amblyopone* of the *australis* group and of the very small "Fulakora" complex.

Amblyopone longidens Forel, reinstated as a good species

A. ferruginea var. *longidens* Forel, 1910, Rev. Suisse Zool. 18: 1, worker.
A. ferruginea Wheeler, 1927, Proc. Amer. Acad. Arts Sci. 62: 20–22, fig. 5, worker (*nec* Clark records *in litt.*, p. 22), *nec* Fred. Smith.

Wheeler (*loc. cit*) wrongly synonymized *longidens* with *A. ferruginea,* as is evident from Forel's short description and his citation of the type locality (Bombala, New South Wales). As Forel stated, *A. longidens* has a large, sharp isolated tooth on the inner mandibular border just basad of the midlength, while the few remaining teeth are grouped along the apical half of the border. This species has a far wider range and is commoner than is *A. ferruginea;* it occurs very close to the Melbourne area (I have seen specimens from Gembrook, Victoria), but has not yet been found actually within the range of *A. ferruginea. A. longidens* is a common ant in open forest and savannah woodland areas of eastern New South Wales; I have examined most of the specimens upon which Wheeler based his New South Wales records, and have, in the company of Mr. Tom Greaves, also found this ant at many places in the hills around Canberra during the early winter after heavy rains, usually under logs and stones. Mr. Bruce Given and I found

it also under slabs of rock in dense scrub of Grampians snow gum (*Eucalyptus alpina*) at Mirranatwa Gap, Grampians Ranges, western Victoria. I have also found numerous workers after rains under logs and grass tree stumps in mallee heath and *Casuarina stricta* scrub near the Ravine des Casoars, western Kangaroo Island, South Australia; the latter is apparently the most westerly known record.

A. longidens varies considerably in size, and many specimens have the head and alitrunk deeply infuscated, but the dentition remains constant; no intergrades to *A. ferruginea* have been seen. The distributional pattern shown by these two species is a curious one, and unaccountable when the seeming lack of barriers or major ecological differences is taken into account. There does seem to be a difference in moisture preferences, with *A. longidens* tolerating drier sites; but why *A. ferruginea* remains known from such a restricted area is a mystery. The distribution of *ferruginea* in and around Melbourne is almost that of an introduced species, and this latter possibility must not be ruled out entirely until the relationship of *ferruginea* to the very similar *A. clarki* Wheeler of southwestern Australia has been thoroughly studied.

Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae) Part XIII

By Charles P. Alexander, University of Massachusetts, Amherst, Massachusetts

(*Continued from page 237*)

Erioptera (Symplecta) sunwapta new species

General coloration gray, the praescutum with three narrow darker brown stripes; wings with the ground rather strongly infuscated; abdomen dark brownish gray, the lateral borders

conspicuously yellow; male hypopygium with the outer dististyle expanded outwardly, bearing a powerful erect spine on outer margin before tip, together with a smaller subapical spine; gonapophysis a simple blackened horn.

♂. Length about 4.8–5.2 mm.; wing 5.5–6 mm.
♀. Length about 5.5 mm.; wing 6 mm.

Rostrum brown, yellowed beneath; palpi brownish black. Antennae black throughout; flagellar segments oval, subequal in length to the verticils, the outer segments more elongate. Head dark gray; eyes (male) large, narrowing the vertex.

Pronotum brown; pretergites yellow. Mesonotal praescutum light brown, with three narrow darker brown stripes, these subequal in width to the interspaces, humeral region more yellowed; posterior sclerites more pruinose, the scutal lobes patterned with darker brown, the posterior callosities yellow; a dark central spot at base of scutellum. Pleura gray, the dorsopleural membrane yellowed behind. Halteres with stem light yellow, its outer third, with the knob, dark brown. Legs with the coxae pruinose; trochanters brownish yellow; remainder of legs brownish black to black. Wings rather strongly infuscated, patterned with darker brown, including spots at origin of *Rs*, Sc_2, cord and outer end of cell *1st* M_2, tip of R_{1+2} and the supernumerary crossvein, and as paler and more diffuse clouds in cell *1st A* adjoining vein *2nd A*, at near midlength and again before the tip; veins brown. Venation: Sc_1 ending just beyond level of R_2, Sc_2 about opposite one-third the length of *Rs;* supernumerary crossvein in cell R_3 opposite tip of vein R_{1+2}; *m–cu* approximately one-half its length before fork of *M;* vein *2nd A* strongly sinuous.

Abdomen dark brown, gray pruinose, the lateral borders of the segments conspicuously yellow; hypopygium fulvous to brownish fulvous. Male hypopygium with the outer dististyle expanded outwardly, bearing a powerful erect spine on outer margin before tip, with a smaller subapical spine; lower edge of style back from apex elevated into a low flange. Inner dististyle subequal in length, appearing as a slender sclerotized rod, its apex obtuse. Gonapophysis a simple blackened horn, the outer

surface with short setae. Phallosome forking into two blades, each of which is produced into two slightly unequal parts.

Habitat. ALBERTA. *Holotype:* ♂, Sunwapta Pass, on the exact border between the Banff and Jasper National Parks along the highway, altitude 6,670 feet, July 21, 1949 (C. P. Alexander). *Allotopotype:* ♀, pinned with type. *Paratopotypes:* Numerous specimens, several unmounted, July 21, 26, August 5, 1949 (C. P. Alexander).

This very distinct fly is readily told from the related regional species, *Erioptera* (*Symplecta*) *cana* (Walker) and *E.* (*S.*) *hybrida* (Meigen), by the very different male hypopygium. The fly was not uncommon in the wet boggy meadows at the Pass, in both the Banff National Park and Jasper National Park. This is in the drainage of the North Saskatchewan River, through Hilda and Nigel Creeks. The specimens were swept from the tundra-like vegetation, including dwarf birch and willow, with grasses and sedges. Conditions were cold and bitter, even on sunny days, since the glaciers of Mount Athabasca and the Columbia Icefield are close at hand.

Molophilus (Molophilus) fenderi new species

Belongs to the *plagiatus* group; general coloration brownish black, sparsely pruinose; antennae (male) approximately one-half as long as the wing; male hypopygium with the basal dististyle a massive blackened structure, its main axis a powerful spine, at near midlength on outer face with a subappressed spine.

♂. Length about 3.5 mm.; wing 4 mm.; antenna about 2 mm.

Rostrum, palpi and head brownish black. Antennae (male) elongate, as shown by the measurements, black throughout; individual segments fusiform, their apices somewhat more narrowed than the bases; verticils exceeding the segments; in addition to the verticils, the segments with several long yellow setae, the longest subequal to the segments.

Thorax brownish black, the surface sparsely pruinose, the scutellum and postnotum more conspicuously so; pretergites narrowly testaceous yellow. Halteres yellow. Legs with the

coxae testaceous yellow, trochanters clearer yellow; remainder of legs dark brown to brownish black, the femoral bases obscure yellow. Wings with a strong blackish tinge, the veins and trichia darker. Venation: R_2 lying some distance beyond the level of *r–m; m–cu* about one-half the petiole of cell M_3; vein *2nd A* moderately sinuous, ending shortly beyond the level of *m–cu*.

Abdomen, including hypopygium, black. Male hypopygium with the beak of the ventral dististyle slender, straight, blackened. Outer dististyle with the arms slightly unequal, the inner one slightly longer and more slender. Basal dististyle a massive blackened structure, the main axis a powerful gently curved spine, at near midlength on outer face with a subappressed black spine that is about half as long as the axial one. In the type, the axial arm bears a very small point or tooth on lower margin a short distance back from the tip.

Habitat. CALIFORNIA, OREGON. *Holotype:* ♂, Castle Creek Forest Camp, Shasta National Forest, Shasta County, California, July 30, 1950 (C. P. Alexander). *Paratype:* 1♂, Beaver Sulphur Creek, Rouge River National Forest, Siskiyou Mountains, Oregon, altitude 1,750 feet, August 10, 1950 (K. M. Fender).

I take great pleasure in naming this distinct fly for Kenneth M. Fender, in remembrance of an outstanding excursion through the Oregon Siskiyous in August 1950. This, the most northerly member of the group in western North America, is readily told from related species, including *Molophilus* (*Molophilus*) *palomaricus* Alexander, *M.* (*M.*) *sequoiae* new species, and *M.* (*M.*) *stolidus* Alexander, by the structure of the male hypopygium.

Molophilus (Molophilus) sequoiae new species

Very similar in its general appearance to *M.* (*M.*) *palomaricus* Alexander and *M.* (*M.*) *stolidus* Alexander, differing in the structure of the male hypopygium. Beak of the ventral dististyle long and slender, straight or virtually so. Outer dististyle with the outer arm a little shorter and stouter than the inner. Basal dististyle a strong curved arm that narrows into a long straight spine, on outer margin at near three-fourth the length

with a strong appressed spine that is approximately one-third as long as the apex; surface of style with more than a dozen punctures, mostly on the proximal two-thirds but with at least one beyond the lateral spine.

In *palomaricus* (Southern California: Palomar Mountain), the beak of the ventral dististyle is slender and straight. Basal dististyle an unusually long and very slender gently curved simple rod that narrows to an acute point. I had originally considered *sequoiae* as representing a paratype of *palomaricus* but now consider them as being sufficiently distinct (Bull. Southern California Acad. Sci. 46: 48, 1947).

In *stolidus* (Arizona: White Mountains), the beak of the ventral dististyle is stout and cleaver-like. Basal dististyle with an outer spine, somewhat as in the present fly, the apical spine much shorter; outer surface of style microscopically scabrous.

Habitat. CALIFORNIA. *Holotype:* ♂, Sequoia National Park, near entrance on Route 198, altitude 4,000 feet, July 18, 1946 (C. P. Alexander).

Periodical Cicada in New Jersey in 1952

In an area, of numerous gravelly knolls, along the eastern side of route 34 about one-half way between Allenwood Circle and where route 34 crosses route 35 (Monmouth County) the periodical cicada appeared in large numbers during the last of May, 1952. By June 12 they were still numerous and noisy. During the two comparatively cooler days of June 23 and 24 they disappeared. By July 3 much terminal twig injury, due to oviposition, was apparent on the oaks. According to the injury to the oaks the infested area was about one mile square principally on the eastern side of route 34, with much less injury on the western side. Other observers who visited the area at the peak of the infestation and before twig injury appeared thought the infested area was at least two miles square.

According to C. L. Marlatt (The Periodical Cicada, Bull. 71. U. S. D. A., 1907) Brood IX, due in 1952, covers a compact

area from the southern part of West Virginia across Virginia into North Carolina and is the southern extension of Brood VIII, one year retarded. The 1952 infestation in New Jersey is believed to be an advance emergence of some members of Brood X due in 1953 and at one time generally distributed over New Jersey, but gradually being eliminated in many areas due to land clearance for farms and building operations.—H. B. WEISS.

Hypera postica (Gyll.) Reaches New Jersey (Col.)

This curculionid, known commonly as the alfalfa weevil was discovered for the first time in New Jersey during the summer of 1952. After the first eastern infestations had been reported from Maryland and Delaware, a joint scouting program was carried on in New Jersey by the State Department of Agriculture and the Entomology Department of the New Jersey Agricultural Experiment Station. As a result larval infestations were found on alfalfa from June 17 to June 26 at Bridgeton, Millville, Quinton, Salem, Atlantic City, Pennsville, Hancocks Bridge, Woodstown, Swedesboro, Mullica Hill and Mickleton. Adults were collected in July at Rio Grande, Cape May, Leesburg and Cedarville. At present the infested area extends roughly along the western border of New Jersey from Gloucester County to Cape May County. In succeeding years adjoining areas will be invaded.—H. B. WEISS.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1952 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL.—Bonnet, P.—Sur l'application de l'article 13 des règles de nomenclature. [110] 8: 57–60. **Bourgin, P.**—De l'utilization d'un latin correct en nomenclature. [110] 8: 60–62. **Downes, W., et al**—(Articles on the history of entomology in British Columbia by W. DOWNES, R. GLENDENNING, E. P. VENABLES, J. D. GREGSON, J. MARSHALL, R. H. HANDFORD, and H. F. OLDS.) [Proc. Ent. Soc. B. C.] 48: 9–36. **Emerson, A. E.**—Phylogeny of social behavior as illustrated by the Termite genus Apicotermes. [9] 113: 544 (Abstract). **Fulton, B. B.**—Speciation. (See under Orthoptera.) **Graham, K.**—A model problem in insect ecology. [Proc. Ent. Soc. Brit. Colum.] 48: 97–99 (Recurvaria milleri Busck). **Metcalf, R. L.**—Insects v. insecticides. [Sci. Amer.] 187 (4): 21–25. **Milne, L. J. and M.**—Light perception in invertebrate animals. [9] 113: 528 (Abstract). **Sokal, R. R.**—Variation in a local population of Pemphigus. [100] 6: 296–315. **Spencer, G. J.**—The 1951 status of our knowledge of the insects of British Columbia. [Proc. Ent. Soc. B. C.]. 48: 36–41. **UNESCO**—Bibliography of scientific publications of South Asia (India, Burma, Ceylon). No. 6, July-Dec., 1951. 124 pp. South Asia Science Cooperation Office, University Buildings, Delhi 8, India. **Zahl, P. A.**—Back-yard monsters in color. [Nat. Geogr. Mag.] 102 (2): 235–60.

ANATOMY, PHYSIOLOGY, MEDICAL—Angus, T. A.—The aerobic bacteria associated with the eastern hemlock looper, Lambdina fiscellaria (Gn.). [24] 30: 208–12. **Beams, H. W., A. W. Sedar and T. C. Evans**—Electron microscope studies on the neurons of the grasshopper. [9] 113: 583 (Abstract). **Boell, E. J.**—The effects of radiations on respiratory metabolism. [J. Cell. Comp. Physiol.] 39: 19–42 (Orthop. eggs). **Bonnier, G.**—Gynandromorph sex combs in Drosophila melanogaster [10] 3: 53–58. **Bowden, S. R.**—Pupal colour and diapause in Pieris napi L. [30] 85: 175–78. **Brown, J. H.**—Tick paralysis. [37] 45: 737. **Buck, J. B. and M. L. Keister**—Total volume, tidal volume and composition of tracheal gas in the Phormia larva. [9] 113: 533 (Abstract). **Buddenrock, W. v. und I. Moller-Racke**—Beitrag zum Lichtsinn der Fliege Eristolomyia tenax. [Zool. Anz.] 149: 51–61. **Burtt, E. T and W. T. Catton**—Nerve impulses originating from the compound eye of the locust. [53] 117: 285. **Carè, E.**—Studio sugli enociti di Musca domestica L. adulta. [Boll. Zool. Agrar. Bach.] 18: 29–34, ill. **Carson, H. L.**—Contrasting

types of population structure in Drosophila. [3] 84: 239–48. **Chefurka, W. and C. M. Williams**—Flavoproteins in relation to diapause and development in the Cecropia silkworm. [9] 113: 562 (Abstract). **Coutin, R.**—Alimentation des larves de Laspeyresia pomonella L. (Lep. Tortr.) sur mileux artificiels. [C. R. Soc. Biol.] 146: 516–20. **Crèvecoeur, M. A.**—Les psychisme des Hyménoptères vespiformes et mellifères. [108] 88: 9–19. **Dahl, J.**—The musculature of the head and mouth parts of the larva of Oryctes nasicornis. [Ent. Meddel.] 26: 196–221. **Davis, D. W.**—Influence of population density on Tetranychus multisetis. [37] 45: 652–54. **Eligh, G. S.**—Factors influencing the performance of the precipitin test in the determination of blood meals of insects. [24] 30: 213–18. **Fingerman, M. and F. A. Brown, Jr.**—Physiological evidence for "rods" and "cones" in the compound eye. [9] 113: 560 (Abstract). **Fisher, R. W.**—The importance of the locus of application on the effectiveness of DDT for the house fly, Musca domestica L. [24] 30: 254–66. **Grandori, L. and D. Facetti**—Ulteriore sperimentazione sugli effetti del'etiluretano sulla mosca domestica adulta. [Boll. Zool. Agrar. Bach.] 18: 21–28. **Green, J.**—Three cases of abnormal nervous systems in Coleoptera. [28] 88: 154–55, ill. **Gregson, J. D.**—Further studies on tick paralysis. [Proc. Ent. Soc. Brit. Colum.] 48: 54–58. **Hackman, R. H. and V. M. Trikojus**—The composition of honeydew secreted by Australian coccids of the genus Ceroplastes. [Biochem J.] 51: 653–56. **Harker, J. E.**—A study of the life cycles and growth-rates of four species of mayflies. [68] 27: 77–85. **Harnisch, O.**—Der O_2-Verbrauch einiger Chironomidenlarven in geschlossenem System unter stark erniedrigtem O_2-Partialdruck (0.248%). [Biol. Zentralbl.] 71: 405–14. **Hoyt, C. P.**—The evolution of the mouth parts of adult Diptera. [50] 17: 61–125, ill. **Jackson, D. J.**—Observations on the capacity for flight of water beetles. [68] 27: 57–70. **Jacobson, L. A.**—Effects of starvation on larvae of the pale western cutworm Agrotis orthogonia Morr. (Lep., Phalaen.). [24] 30: 194–200. **Ketchel, M. and C. M. Williams**—Relationship between the hemagglutination factor and the growth and differentiation hormone in the Cecropia silkworm. [9] 113: 563 (Abstract). **King, R. C.**—The uptake and distribution of phosphorus in adult Drosophila melanogaster. [9] 113: 550 (Abstract). **Krause, G.**—Schnittoperation im Insektenei zum Nachweiss complentärer Induktion bei Zwillingsbildung. [Naturwiss.] 39: 356, ill. **Maltais, J. B.**

and J. L. Auclair—Occurrence of amino acids in the honeydew of the crescent-marked lily aphid, Myzus circumflexus (Buck.) [24] 30: 191–93. **Moller-Racke, I.**—Farbensinn und Farbenblindheit bei Insekten. [Zool. Jb. (Physiol.)] 63: 237–74. **Moretti, G. P. e F. Cianficconi**—Ancora sui "corpora allata" delle larve dei Tricotteri. [Boll. Soc. Ital. Biol. Sperim.] 28: 134–136. **Morgan, C. V. G.**—Effects of some low winter temperatures on some orchard mites. [Proc. Ent. Soc. Brit. Colum.] 48: 90–93. **Palm, N.-B.**—Storage and excretion of vital dyes in insects, with special regard to trypan blue. [10] 3: 195–272. **Perttunen, V.**—The humidity preferences of various carabid species (Col., Carabidae) of wet and dry habitats. [Ann. Ent. Fennici] 17: 72–84. **Power, M. E.**—The effect of molting, puparium formation and pupation on the growth of the central nervous system of Drosophila. [9] 113: 575 (Abstract). **Sacarrão, G. la F.**—On blastokinesis in Cephalopoda and Insecta. [Rev. Fac. Cien., 2a ser., C] 1:359–64. **Sanborn, R. C.**—Pyridine nucleotides and flavin compounds in the adult development of Cecropia silk-moths. [9] 113: 562–63 (Abstract). **Schneiderman, H. A. and C. M. Williams**—The terminal oxidases in diapausing and non-diapausing insects. [9] 113: 561–62 (Abstract). **Shappirio, D. G. and C. M. Williams**—Spectroscopic studies of the cytochrome system of the Cecropia silkworm at the temperature of liquid nitrogen. [9] 113: 561 (Abstract). **Shihata, A.M.E.-T.A. and E. M. Mrak**—Intestinal yeast floras of successive populations of Drosophila. [100] 6: 325–32. **Slifer, E. H.**—Connective tissue in the locust. [9] 113: 572 (Abstract). **Smith, K. M. and N. Xeros**—Transmission of polyhedral virus between different insect species. [53] 170: 492. **Spieth, H. T.**—Mating behavior within the genus Drosophila (Diptera). [Bull. Amer. Mus. Nat. Hist.] 99 (7): 401–74, $1.00. **Stephens, G. C., M. Fingerman, and F. A. Brown, Jr.**—A non-birefringent mechanism for orientation to polarized light in Arthropods. [9] 113: 559 (Abstract). **Sturtevant, F. M., Jr., L. D. Calvin and O. Park**—Elytral variation in a population of lady-bettles. [9] 113: 615 (Abstract). **Symmons, S.**—Comparative anatomy of the Mallophagan head. [Trans. Zool. Soc. London] 27 (4): 350–436. **Telfer, W. H. and C. M. Williams**—The relation of the blood proteins to egg formation in the Cecropia silkworm. [9] 113: 563 (Abstract). **Thomas, M.**—L'instinct chez les Araignées. Observations sur Lycosa radiata Latr. [108] 88: 82–90. **Tinker, M. E.**—The seasonal behavior

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Errata

In article by P. H. Arnaud on "Swarming of Blacus sp. in California," in No. 6: 149–150 (June 1952).

On page 150, line 5, "Those" should read "These," and line 7 should be deleted and the following inserted "barbecue pit, usually at a height of 5 to 7 feet. The swarms"

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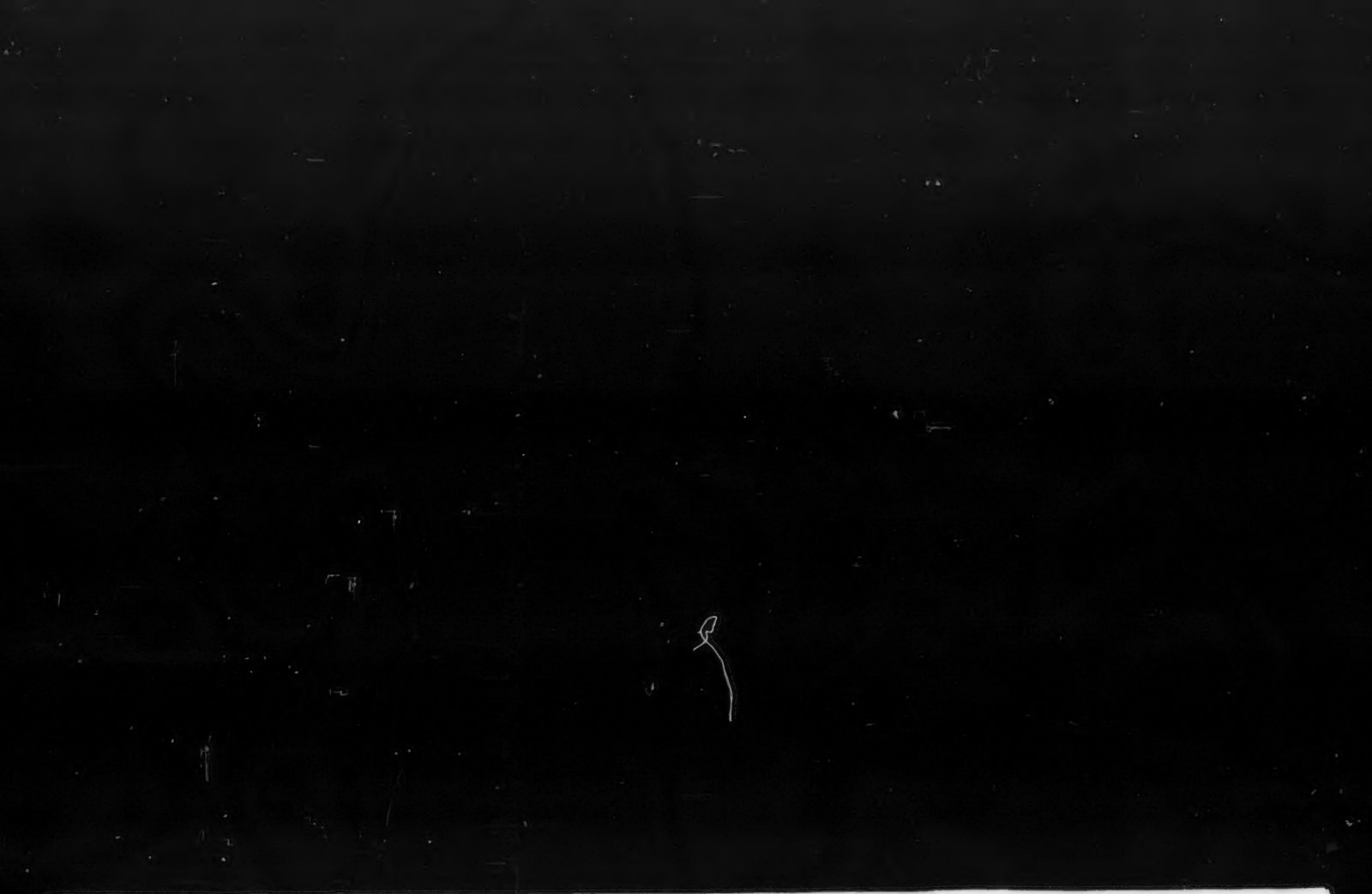
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